

H13137

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: H13137

LOCALITY

State(s): Oregon

General Locality: Offshore California, Oregon and Washington

Sub-locality: Stonewall Bank to Offshore Cape Meares

2018

CHIEF OF PARTY
Benjamin K. Evans, CDR/NOAA

LIBRARY & ARCHIVES

Date:

HYDROGRAPHIC TITLE SHEET

H13137

INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

State(s): **Oregon**

General Locality: **Offshore California, Oregon and Washington**

Sub-Locality: **Stonewall Bank to Offshore Cape Meares**

Scale: **80000**

Dates of Survey: **08/01/2018 to 08/10/2018**

Instructions Dated: **07/30/2018**

Project Number: **OPR-M367-RA-18**

Field Unit: **NOAA Ship *Rainier***

Chief of Party: **Benjamin K. Evans, CDR/NOAA**

Soundings by: **Multibeam Echo Sounder**

Imagery by: **Multibeam Echo Sounder Backscatter**

Verification by: **Pacific Hydrographic Branch**

Soundings Acquired in: **meters at Mean Lower Low Water**

Remarks:

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts and provide data which will contribute to the Coastal and Marine Geology Program's assessment of earthquake, tsunami and landslide hazards in the survey area. All separates are filed with the hydrographic data. Any revisions to the Descriptive Report (DR) generated during office processing are shown in bold red italic text. The processing branch maintains the DR as a field unit product, therefore, all information and recommendations within the body of the DR are considered preliminary unless otherwise noted. The final disposition of surveyed features is represented in the OCS nautical chart update products. All pertinent records for this survey, including the DR, are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via <http://www.ncei.noaa.gov/>.

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Descriptive Report to Accompany Survey H13137

Project: OPR-M367-RA-18

Locality: Offshore California, Oregon and Washington

Sublocality: Stonewall Bank to Offshore Cape Meares

Scale: 1:80000

August 2018 - August 2018

NOAA Ship *Rainier*

Chief of Party: Benjamin K. Evans, CDR/NOAA

A. Area Surveyed

The survey area is referred to as H13137, "Stonewall Bank to Offshore Cape Meares" (Sheet 2) within the project instructions. The initial assigned area encompasses approximately 1016 square nautical miles. However, the assigned area was reduced to approximately 683.4 square nautical miles due to shifting priorities and time constraints.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
45° 33' 8.92" N	44° 37' 12.71" N
124° 19' 8.24" W	124° 12' 2.15" W

Table 1: Survey Limits

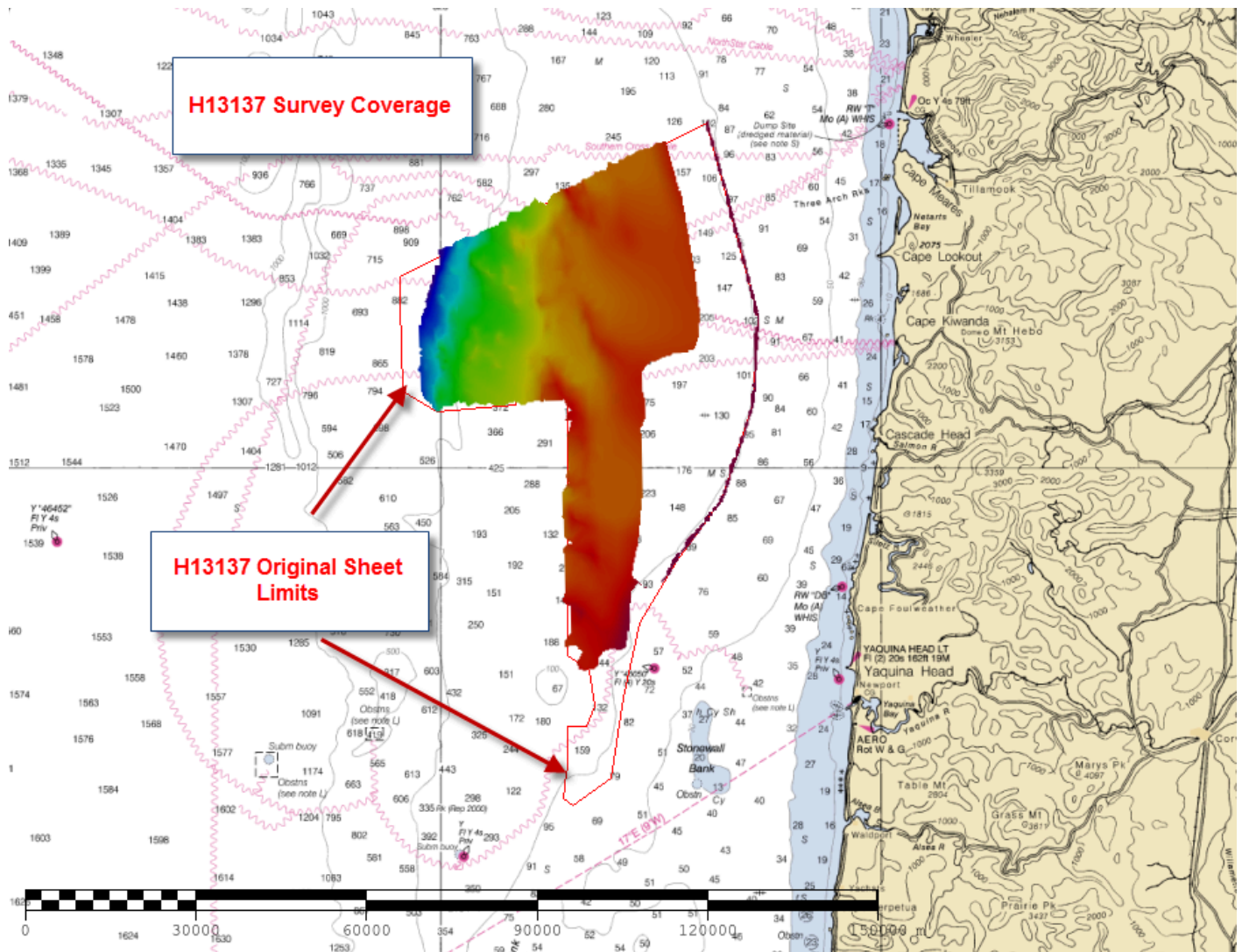


Figure 1: Graphic of H13137 survey coverage and original assigned sheet limits (Chart 18003).

Data were acquired within survey limits as required in the Project Instructions and HSSD unless otherwise noted in this report.

A.2 Survey Purpose

The primary objective of Sheet H13137 will be to provide multibeam bathymetry, backscatter data, and water column data in the locality of Stonewall Bank to Cape Meares off of the Oregon Coast. These data will be used to update existing nautical charts as well as address USGS Hazard Mission Area objectives by providing key offshore constraints that feed directly into earthquake, tsunami, and landslide hazard assessments as well as situational awareness products. High-resolution multibeam and backscatter imagery allow identification and characterization of active faults and submarine landslides. These data will also

provide an important pre-event bathymetric baseline for rapid assessment of seafloor deformation after a large earthquake. Water column data will expand mapping of seafloor seep distribution, which is key for understanding the relationship between seafloor failure and seismogenesis along the Cascadia margin.

A.3 Survey Quality

The survey is partially adequate to supersede previous data.

Regions of edge fliers discussed in detail in section B.2.9 are not adequate to supersede data in those areas.

Pydro QC Tools 2 Grid QA was used to analyze the submitted H13137 finalized variable-resolution (VR) multibeam echosounder MBES surface. Ninety nine percent of VR grid nodes passed data density requirements.

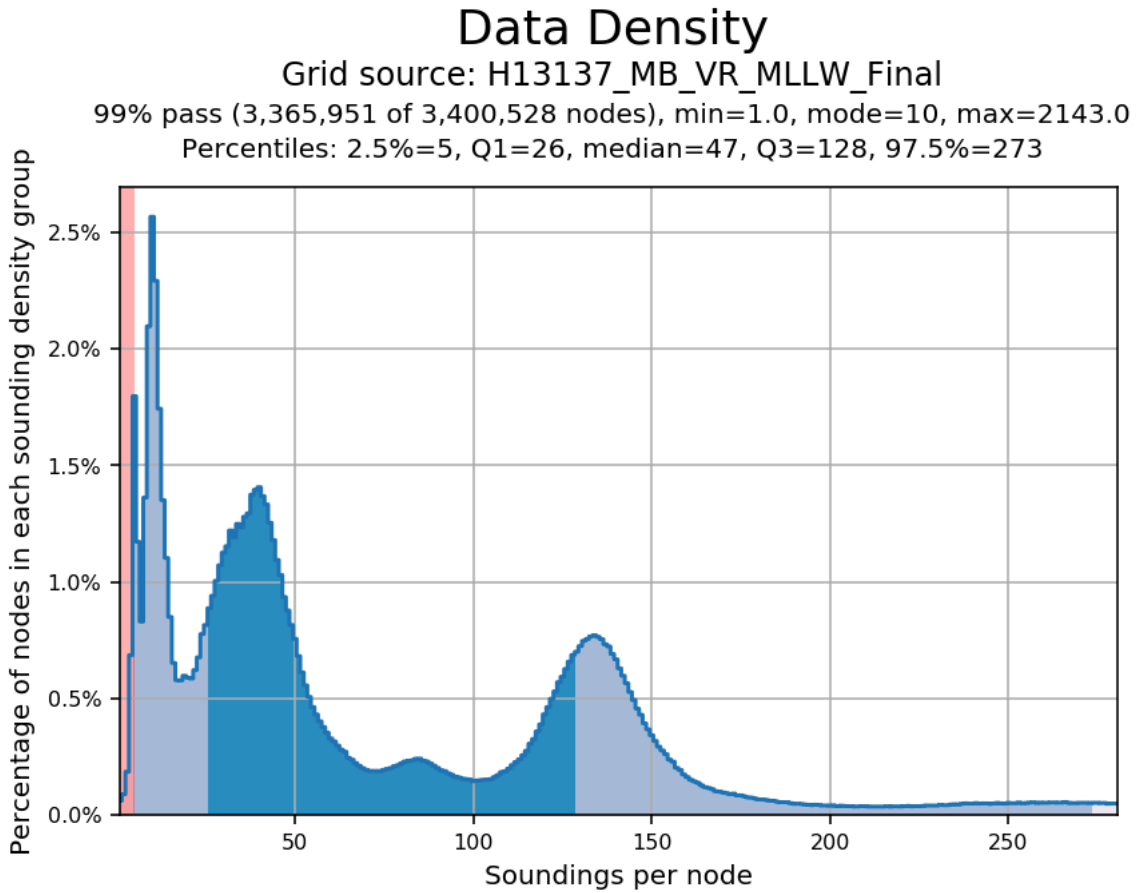


Figure 2: Pydro Grid QA derived plot showing data density compliance of H13137 finalized variable-resolution MBES data.

During review at the Pacific Hydrographic Branch, it was determined that this survey is adequate to supersede the chart. The potential fliers highlighted within B.2.9 are well within uncertainty specifications at their respective depth.

A.4 Survey Coverage

The following table lists the coverage requirements for this survey as assigned in the project instructions:

Water Depth	Coverage Required
All waters in survey area	Complete coverage MBES data, backscatter data and water column data. Refer to HSSD Section 5.2.2.3.

Table 2: Survey Coverage

Complete multibeam, backscatter, and water column data were acquired to the revised sheet limits of H13137. The assigned survey area was reduced as discussed in Section A above and is depicted visually in the graphic below. No gaps in coverage (holidays) were detected when using Pydro QC Tools2 software.

A.6 Survey Statistics

The following table lists the mainscheme and crossline acquisition mileage for this survey:

	HULL ID	<i>S221</i>	<i>Total</i>
LNM	SBES Mainscheme	0	0
	MBES Mainscheme	1149.08	1149.08
	Lidar Mainscheme	0	0
	SSS Mainscheme	0	0
	SBES/SSS Mainscheme	0	0
	MBES/SSS Mainscheme	0	0
	SBES/MBES Crosslines	93.85	93.85
	Lidar Crosslines	0	0
Number of Bottom Samples			0
Number Maritime Boundary Points Investigated			0
Number of DPs			0
Number of Items Investigated by Dive Ops			0
Total SNM			683.54

Table 3: Hydrographic Survey Statistics

The following table lists the specific dates of data acquisition for this survey:

Survey Dates	Day of the Year
08/01/2018	213
08/05/2018	217
08/06/2018	218
08/07/2018	219
08/08/2018	220
08/09/2018	221
08/10/2018	222

Table 4: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to the Data Acquisition and Processing Report (DAPR) for a complete description of data acquisition and processing systems, survey vessels, quality control procedures, and data processing methods. Additional information to supplement sounding and survey data and any deviations from the DAPR are discussed in the following sections.

B.1.1 Vessels

The following vessels were used for data acquisition during this survey:

Hull ID	<i>S221</i>
LOA	70.4 meters
Draft	4.7 meters

Table 5: Vessels Used



Figure 3: NOAA Ship Rainier (S221).

All data for H13137 were acquired by NOAA Ship RAINIER (S221). The vessel acquired depth soundings, backscatter imagery and sound speed profiles.

B.1.2 Equipment

The following major systems were used for data acquisition during this survey:

Manufacturer	Model	Type
Applanix	POS MV 320 v5	Positioning and Attitude System
Kongsberg Maritime	EM 710	MBES
Teledyne RESON	SVP 70	Surface Sound Speed Sensor
Sippican, Inc.	XBT Deep Blue	Temperature Sensor

Table 6: Major Systems Used

Refer to the Data Acquisition and Processing Report (DAPR) for a comprehensive description of data acquisition and processing systems, survey vessels, quality control procedures, and data processing methods. Additional information to supplement sounding and other survey data and any deviations from the DAPR are discussed in this report.

B.2 Quality Control

B.2.1 Crosslines

Multibeam/single beam echo sounder/side scan sonar crosslines acquired for this survey totaled 8.17% of mainscheme acquisition.

A Variable Resolution CUBE surface was created using only mainscheme lines and a second Variable Resolution CUBE surface was created using only crosslines. The surfaces were evaluated with the Pydro program "Compare Grids" from which statistics and graphics were derived. For its respective depths, the difference surface was compared to IHO allowable Total Vertical Uncertainty (TVU) standards. In total, 99.5+% of the depth differences between H13137 mainscheme and crossline data met HSSD TVU standards. The analysis was performed on H13137 MBES data reduced to Mean Lower-Low Water (MLLW) using Vertical Datum (VDatum) separation model.

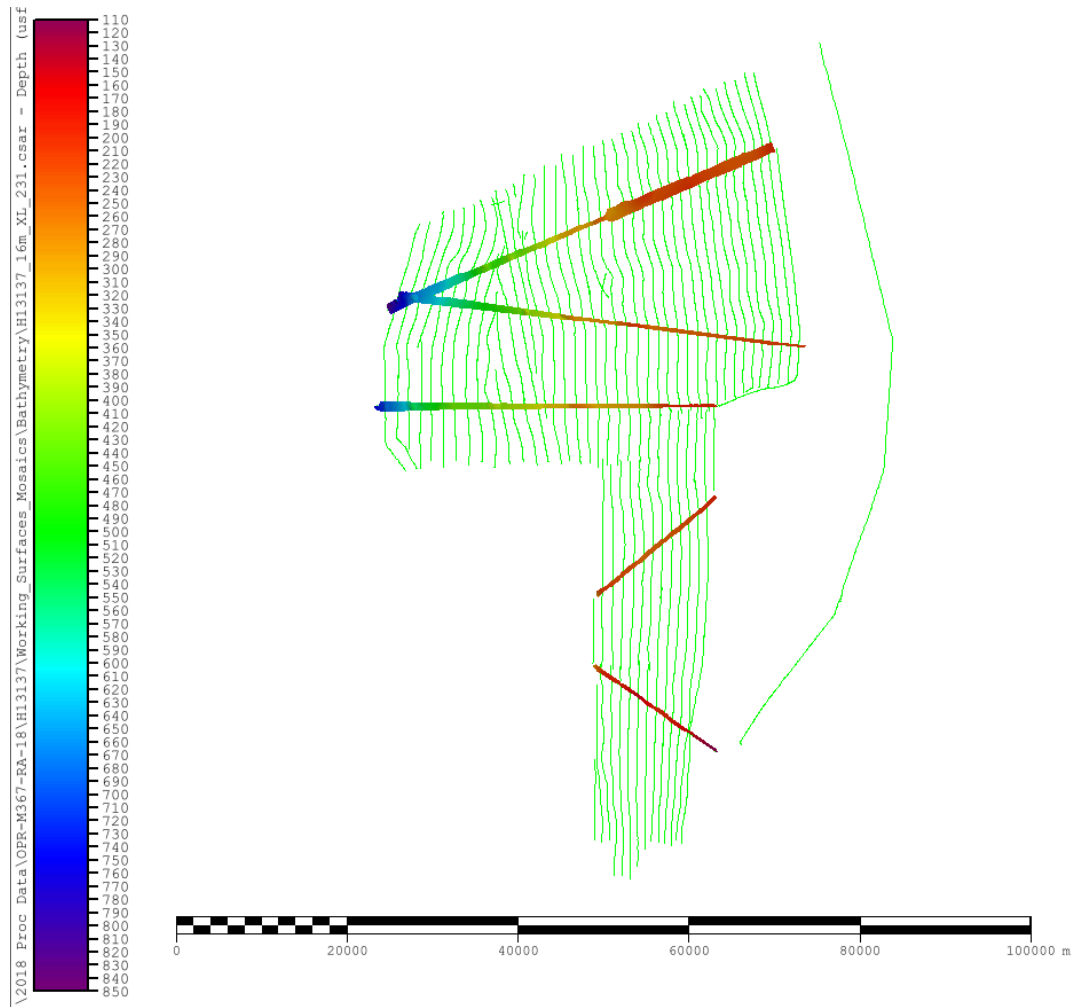


Figure 4: H13137 crossline surface overlaid on mainscheme tracklines.

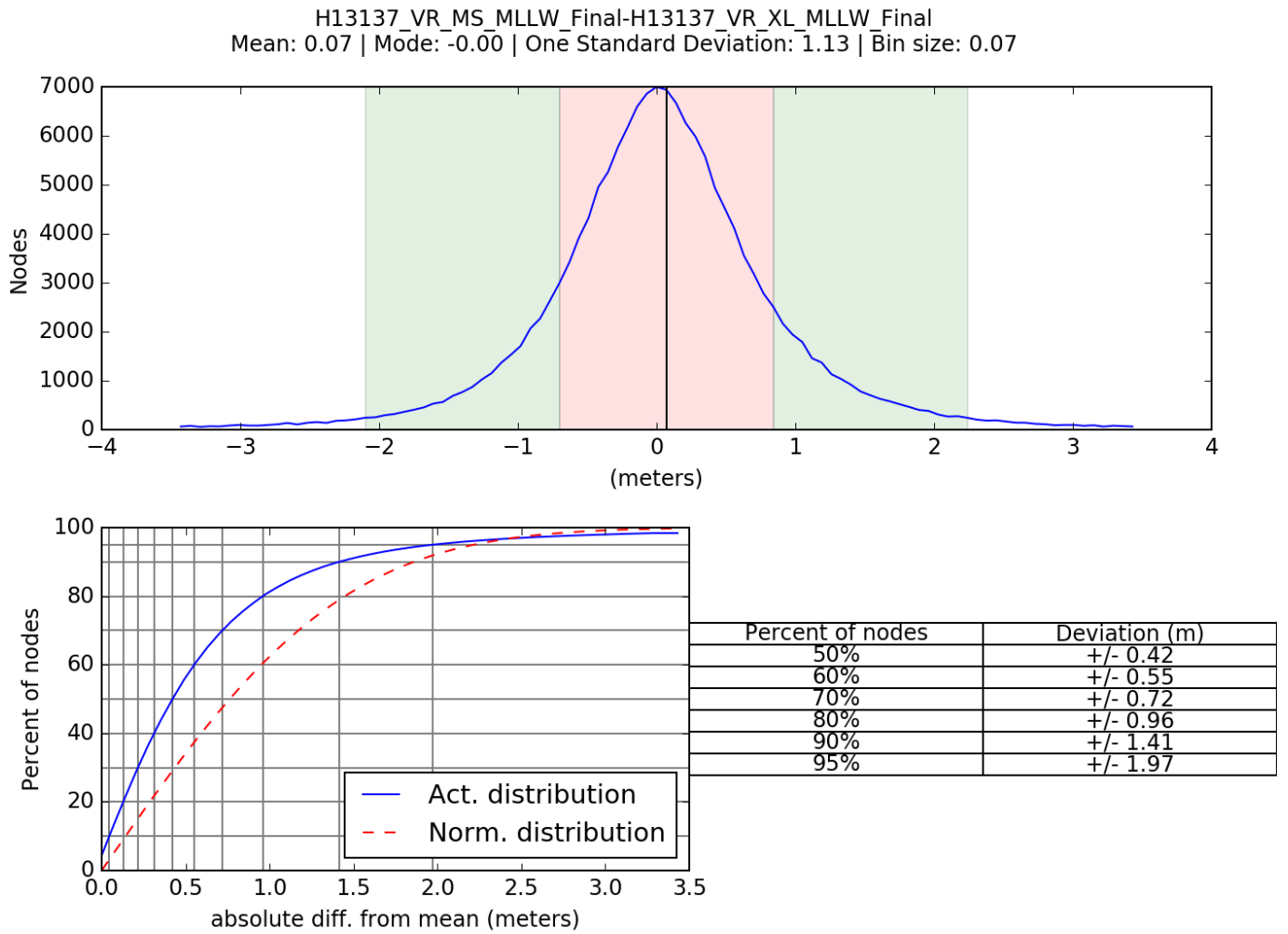


Figure 5: Pydro derived plot showing absolute difference statistics of H13137 variable resolution mainscheme to crossline data.

Comparison Distribution

Per Grid: H13137_MS_diff_XL_VR_fracAllowErr.csar

99.5+% nodes pass (157527), min=0.0, mode=0.1 mean=0.0 max=2.0

Percentiles: 2.5%=0.0, Q1=0.0, median=0.0, Q3=0.0, 97.5%=0.1

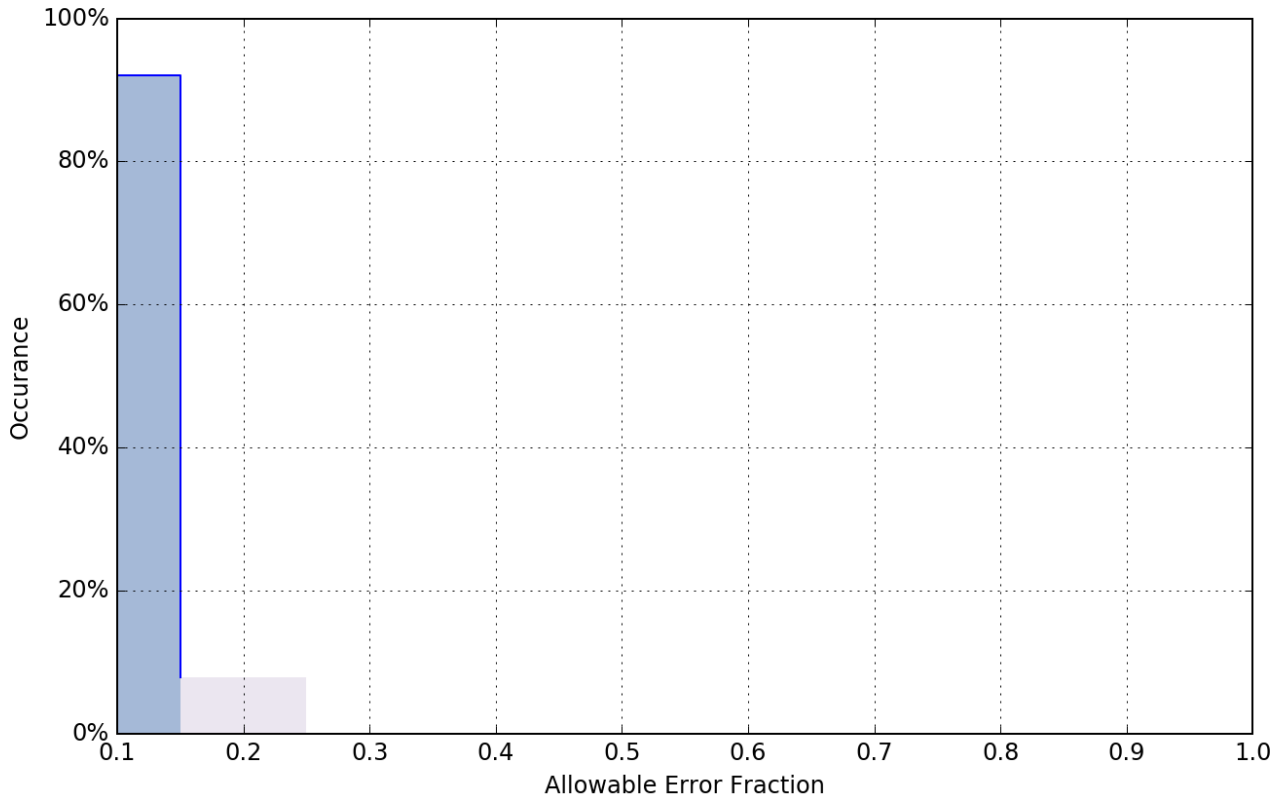


Figure 6: Pydro derived plot showing percentage of H13137 crossline to mainscheme nodes within allowable limits based on variable resolution surfaces.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0 meters	0.173 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Surface
S221	N/A meters/second	N/A meters/second	0.05 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

Total Propagated Uncertainty (TPU) values for survey H13137 were derived from a combination of fixed values for equipment and vessel characteristics, as well as from field assigned values for sound speed uncertainties. Due to the depth of the survey area, CTDs were not used for sound speed measurements. Sippican Deep Blue XBTs were used instead and given an uncertainty value of 4.0 meters/second. Tidal zoning uncertainty of 0.173 meters was provided in the Project Instructions as part of VDatum. See the 2018 DAPR for further information.

In addition to the usual a priori estimates of uncertainty, some real-time and post-processing uncertainty sources were also incorporated into the depth estimates of this survey. Real-time uncertainties from Kongsberg MBES sonars were recorded and applied in post-processing. Applanix TrueHeave (POS) files, which record estimates of heave uncertainty, were applied during post-processing. Finally, the post processed uncertainties associated with vessel roll, pitch, yaw, and position were applied in Caris HIPS using SBET and RMS files generated using POSpac MMS software.

Uncertainty values of the submitted finalized grid was calculated in Caris using "Greater of the Two" of uncertainty and standard deviation (scaled to 95%). Grid QA v5 within Pydro QC Tools 2 was used to analyze H13137 TVU compliance. A histogram plot of the results is shown below.

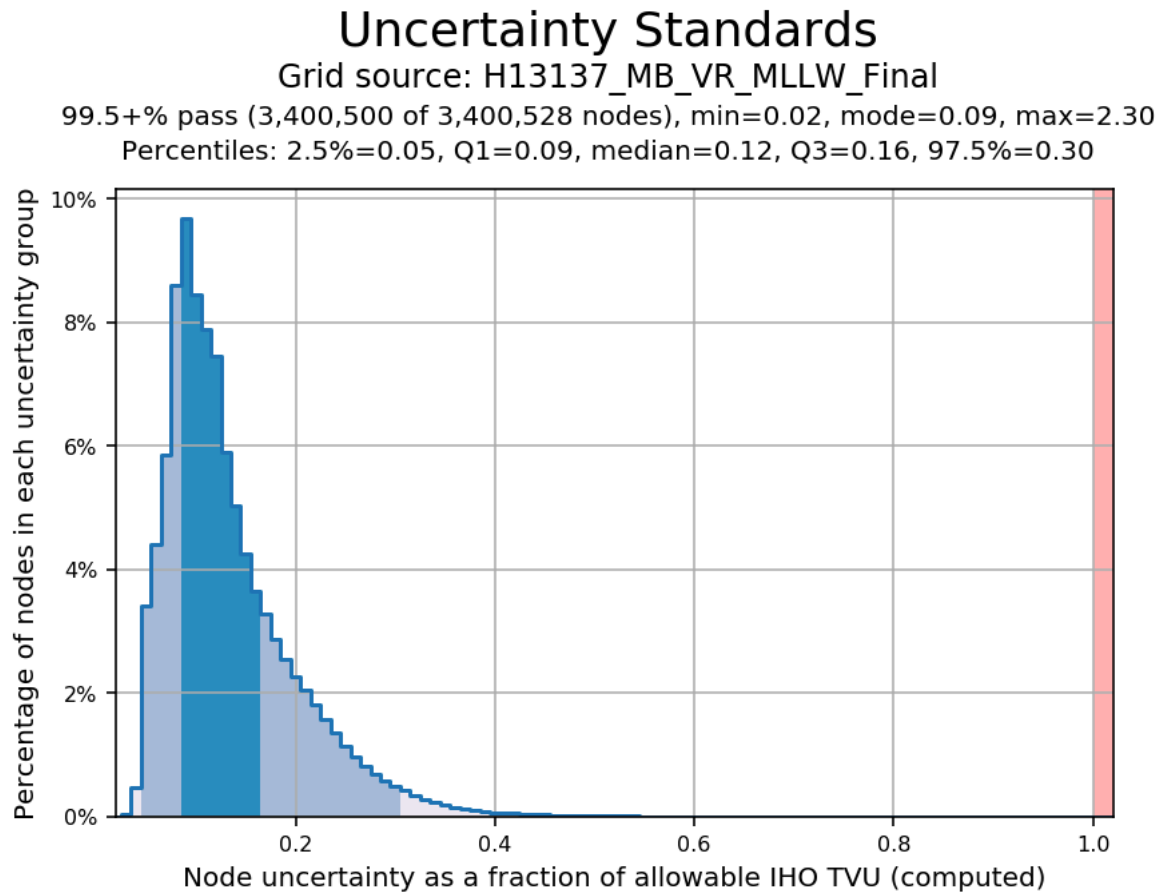


Figure 7: Pydro derived plot showing TVU compliance of finalized variable resolution MBES grid data.

B.2.3 Junctions

One junction comparison was completed for survey H13137. Survey H13119 was acquired concurrently with this survey.



Figure 8: H13137/H13119 junction.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H13119	1:80000	2018	NOAA Ship RAINIER	N

Table 9: Junctioning Surveys

H13119

The junction with survey H13119 encompassed 19.69 square nautical miles along the northern boundary of survey H13137. A comparison was made with Pydro Explorer Compare Grids function using Caris variable resolution (ranges) surfaces from each survey; the results are shown in the figures below. Additionally, the Compare Grids tool creates a difference surface from which statistics were derived in Caris. The computed statistics indicated the average difference in depth between H13137 and H13119 was -0.47 meters with a standard deviation of 1.95.

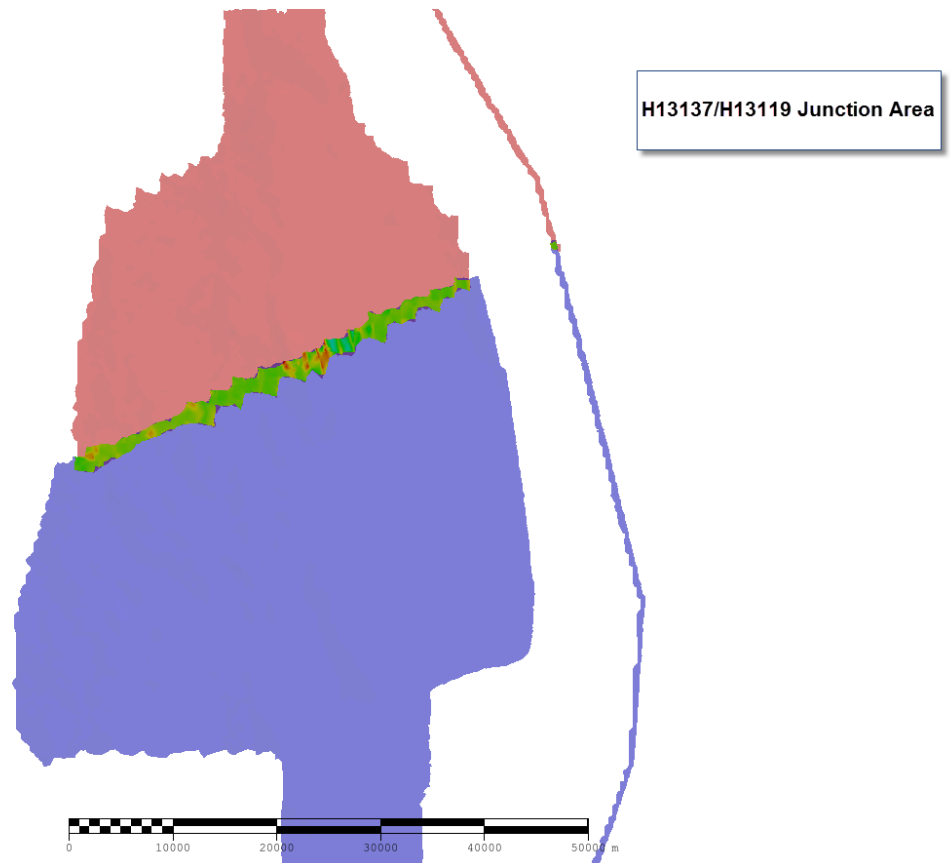


Figure 9: H13137/H13119 junction area. Higher than allowable depth nodes are shown in red, those meeting depth standards are green.

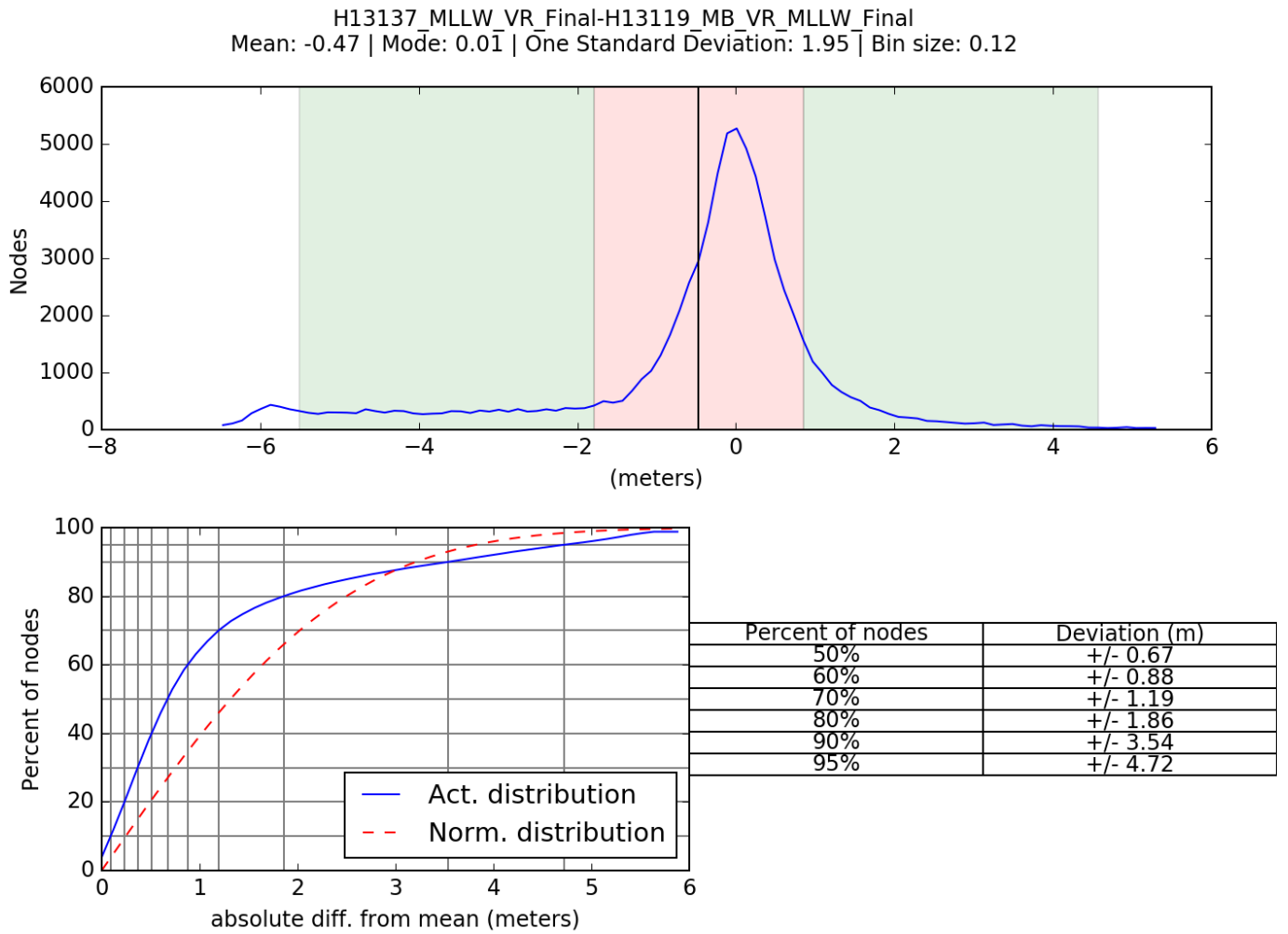


Figure 10: Pydro derived plot showing H13137/H13119 VR surface comparison statistics.

Comparison Distribution

Per Grid: H13137_MLLW_VR_Final-H13119_MB_VR_MLLW_Final_fracAllowErr.csar

100% nodes pass (76561), min=0.0, mode=0.1 mean=0.1 max=0.8

Percentiles: 2.5%=0.0, Q1=0.0, median=0.0, Q3=0.1, 97.5%=0.4

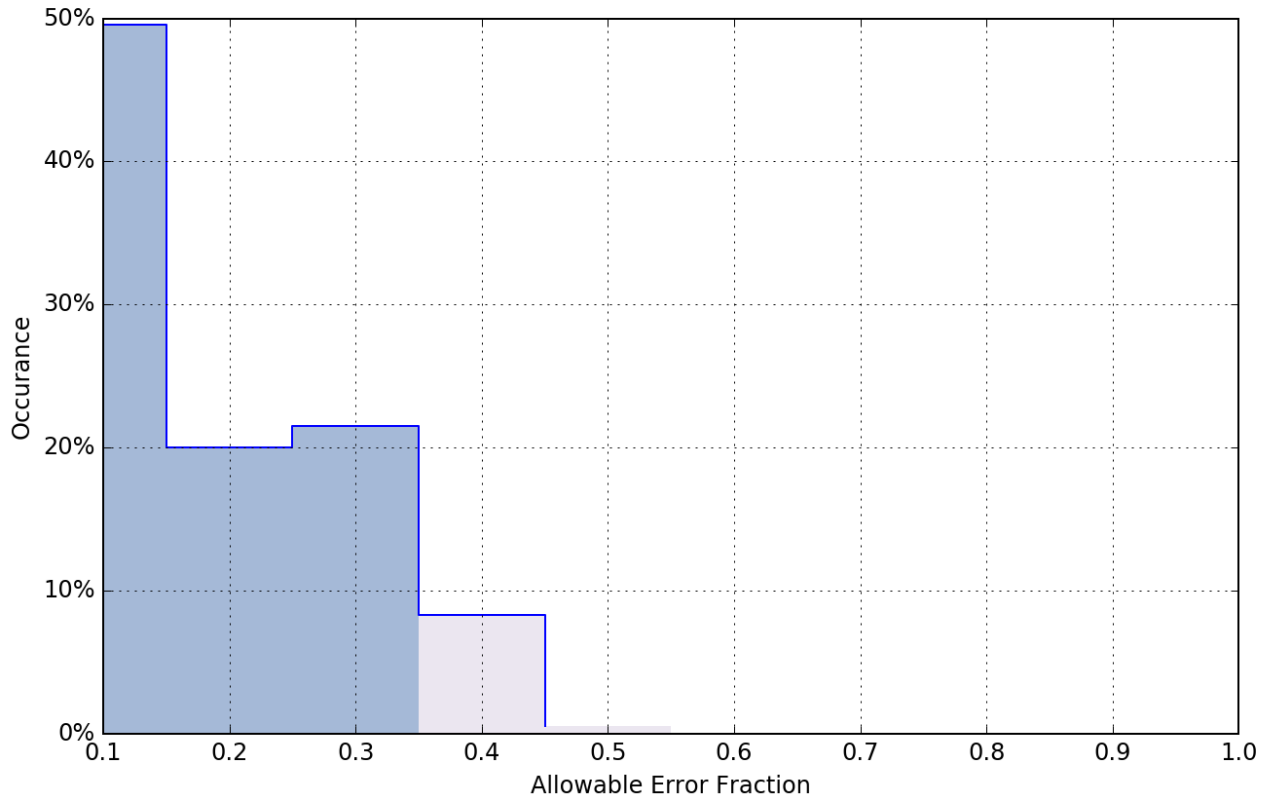


Figure 11: Pydro derived plot showing H13137/H13119 VR surface comparison statistics.

B.2.4 Sonar QC Checks

Sonar system quality control checks were conducted as detailed in the quality control section of the DAPR.

B.2.5 Equipment Effectiveness

Sonar Ping Mode

Survey H13137 was conducted in order to produce bathymetric data, water column, and high quality backscatter data. In order to acquire high quality backscatter data, minimal changes to the sonar's operating

mode were required. Instead of operating sonar ping mode automatically, it was manually switched between "deep", "very deep", and "extra deep" where appropriate. The hydrographer monitored the effects of these manual changes out in the field and found no issues with the resulting data.

B.2.6 Factors Affecting Soundings

There were no other factors that affected corrections to soundings.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: The ship took casts at least once every four hours.

Fifty one sound speed profiles were acquired using Sippican Deep Blue XBT Profilers. All casts were concatenated into a master file and applied to MBES data in Caris HIPS using the "Nearest in distance within time" (4 hours) profile selection method. There are two casts outside of the survey sheet limits in the southeastern and northern survey area. The casts were used because of their relative proximity to the original sheet limits as well as being in open, calm water.

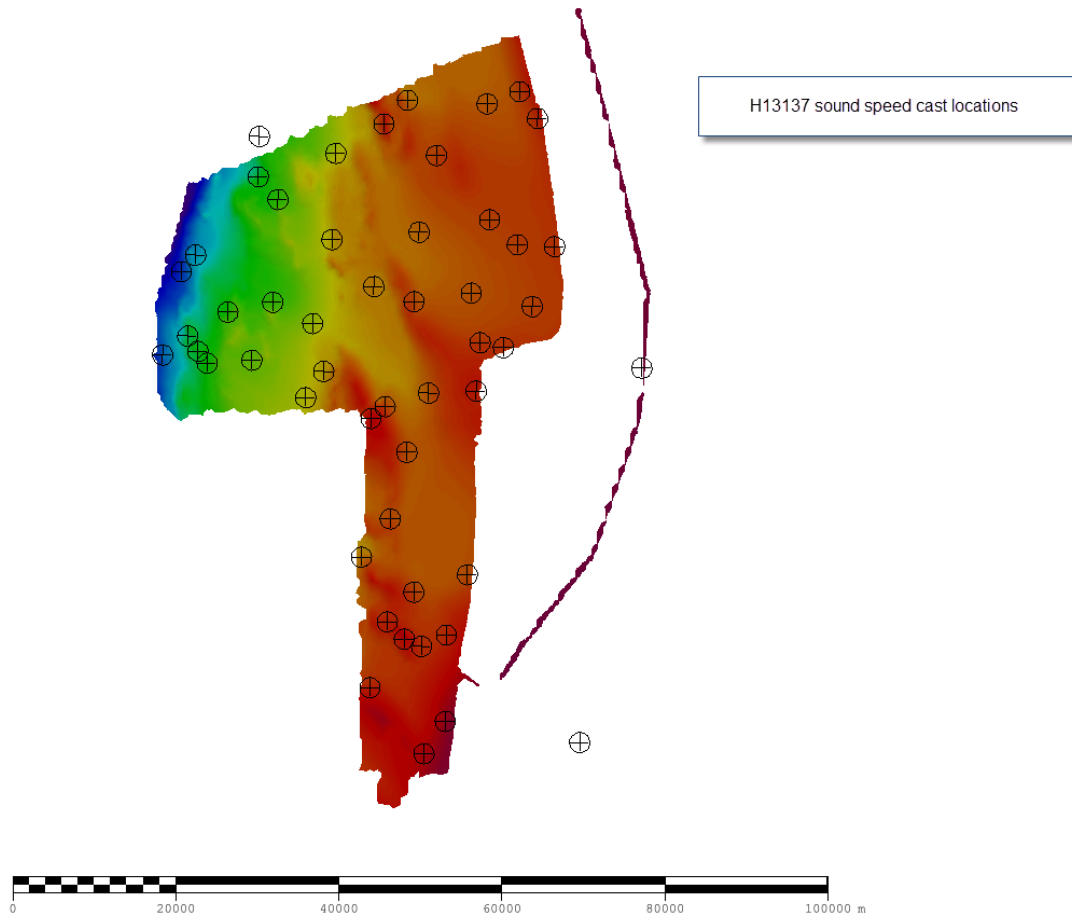


Figure 12: H13137 sound speed cast locations.

B.2.8 Coverage Equipment and Methods

All equipment and survey methods were used as detailed in the DAPR.

B.2.9 Detect Fliers

Pydro QC Tools 2 Detect Fliers was used to find fliers in the finalized VR surface. The following are the settings used for Detect Fliers: (1) Force flier heights left blank (2) Checks -#1 and #6 unchecked, #2, #3, #4, and #5 checked (3) Fliers - Distance ≤ 1.0 node3s, Delta Z ≤ 0.01 meters, #1 and #2 unchecked.

Obvious noise was rejected by the hydrographer in Caris subset editor. After data cleaning, Detect Fliers was run again and found 32 "potential" fliers. After investigation, these fliers were found to be the result of low density nodes on the edge of the project area in 1500-1600 meters of water. These fliers were retained after several additional cleanings failed to remove them. The results of the Detect Fliers tool are included as a .000 file in the Separates section of this report. Potential fliers shown in the figure below.

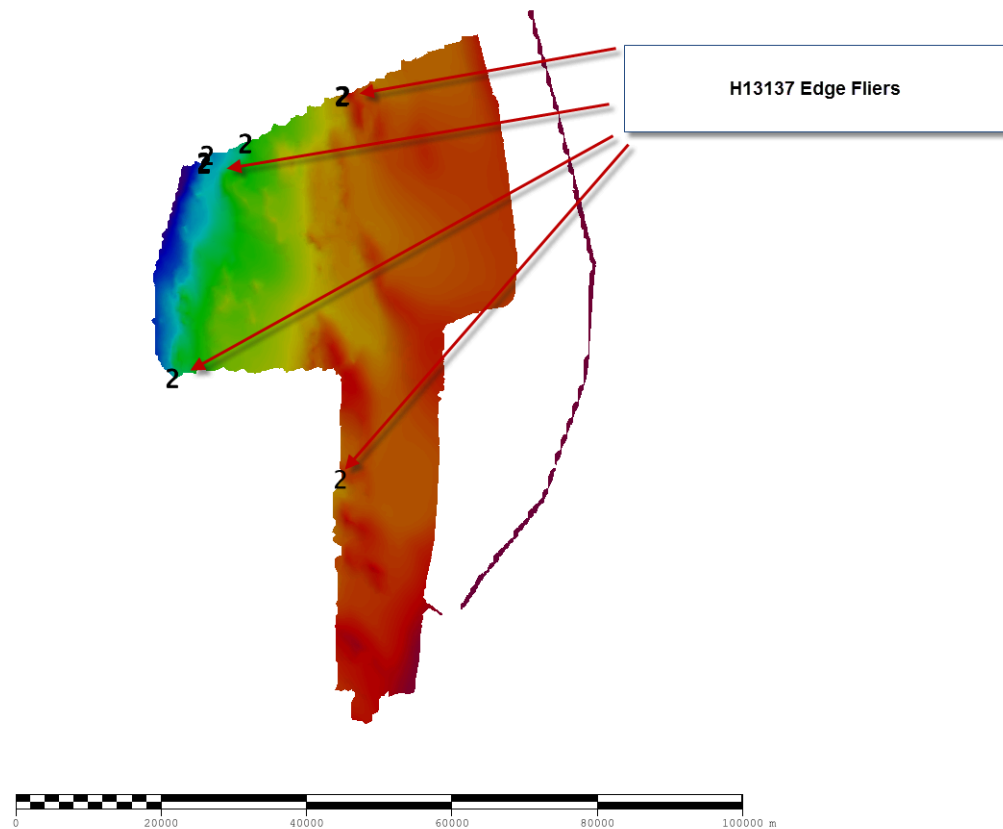


Figure 13: Example of edge fliers.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

All data reduction procedures conform to those detailed in the DAPR.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Raw Backscatter was acquired as .all files during MBES operations and subsequently processed by personnel aboard the Rainier. One mosaic has been delivered with this report. All backscatter processing procedures utilized follow those detailed in the DAPR.

The processing software FMGT showed holidays in the backscatter mosaics when pairing raw MBES .all files with processed HDCS files. Each survey line within the assigned sheet limits measures approximately 12 nautical miles. MBES acquisition was constant throughout the survey; due to file size limitations a new survey line was required to be started every 30 minutes. This created a small gap in backscatter coverage when the line breaks and restarts. These holidays are not present in the bathymetry data. The 30 minute line setting in the Kongsberg MBES systems can be changed but was not for consistency purposes. No errors occurred during backscatter processing for this survey.

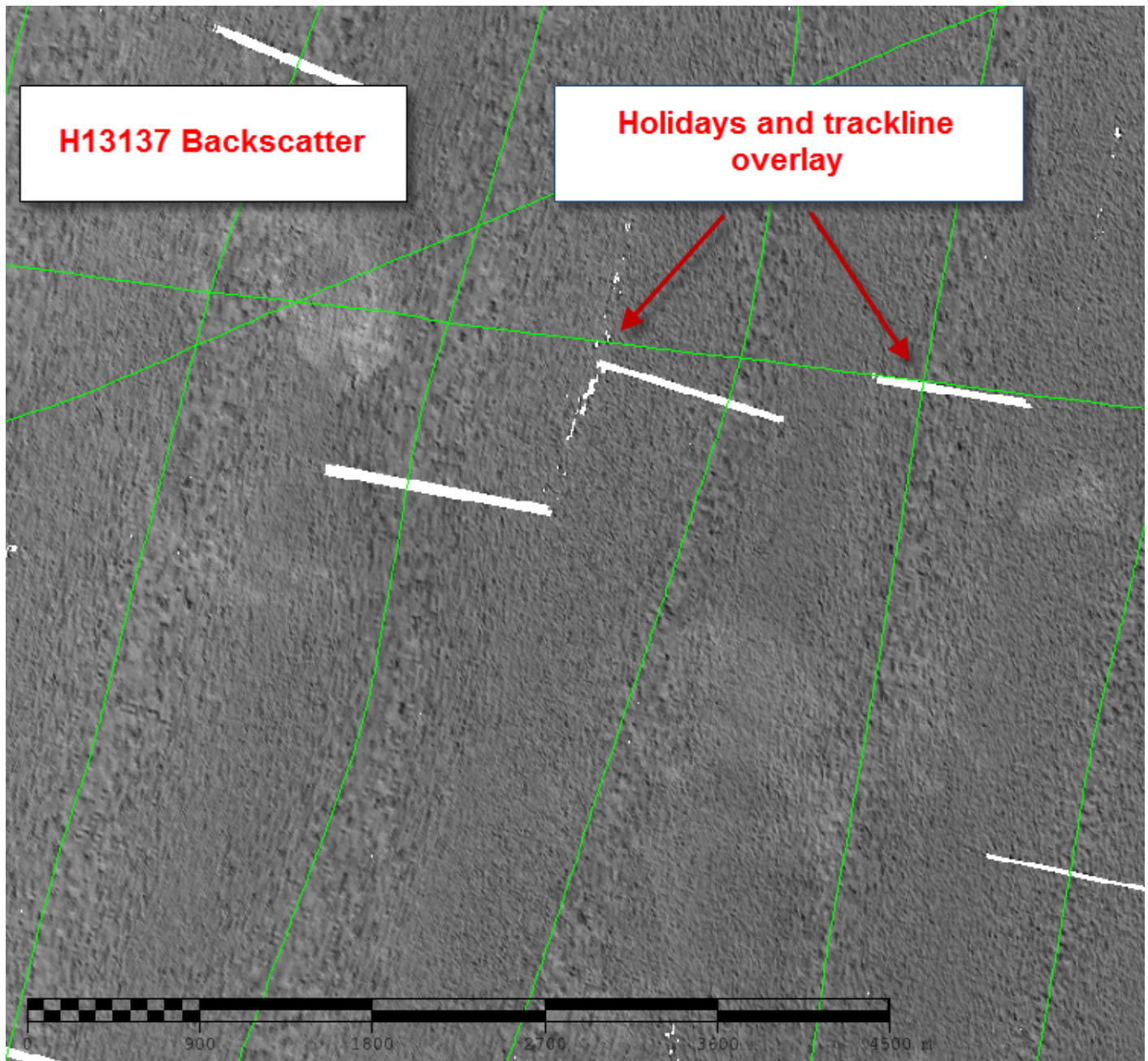


Figure 14: Examples of holidays in processed H13137 backscatter mosaic. H13137 tracklines overlaid on the 2 meter mosaic.

B.5 Data Processing

B.5.1 Primary Data Processing Software

The following software program was the primary program used for bathymetric data processing:

Manufacturer	Name	Version
Caris	HIPS/SIPS	10.3.3

Table 10: Primary bathymetric data processing software

The following software program was the primary program used for imagery data processing:

Manufacturer	Name	Version
QPS	Fledermaus Geocoder Toolbox (FMGT)	7.8.1

Table 11: Primary imagery data processing software

The following Feature Object Catalog was used: NOAA Profile V_5_7.

B.5.2 Surfaces

The following surfaces and/or BAGs were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H13137_MB_VR_MLLW_Final	CARIS VR Surface (CUBE)	Variable Resolution	169.3 meters - 1596.1 meters	NOAA_VR	Complete MBES
H13137_MB_VR_MLLW	CARIS VR Surface (CUBE)	Variable Resolution	169.3 meters - 1596.1 meters	NOAA_VR	Complete MBES

Table 12: Submitted Surfaces

Submitted surfaces were generated using the recommended parameters for "Ranges" style variable resolution bathymetric grids as specified in HSSD 2018. No soundings were designated in this survey and no Dangers to Navigation (DTONs) were detected throughout the survey area.

C. Vertical and Horizontal Control

There were no tide gauges or base stations installed by the survey vessel crew for this project; no Horizontal and Vertical Control Report (HVCR) was submitted.

C.1 Vertical Control

The vertical datum for this project is Mean Lower Low Water.

ERS Datum Transformation

The following ellipsoid-to-chart vertical datum transformation was used:

Method	Ellipsoid to Chart Datum Separation File
ERS via VDATUM	OPR-M367-RA-18_VDatum_Survey_Sheets_xyNAD83- MLLW_geoid12b.csar

Table 13: ERS method and SEP file

C.2 Horizontal Control

The horizontal datum for this project is North American Datum of 1983 (NAD 83).

The projection used for this project is Universal Transverse Mercator (UTM) Zone 10.

WAAS

Precise Positioning-Real Time Extended (PP-RTX) processing methods were used in Applanix POSPac MMS 8.1 software to produce Smooth Best Estimates of Trajectory (SBETs) for post-processing horizontal correction.

D. Results and Recommendations

D.1 Chart Comparison

A comparison was made between H13137 survey data and Electronic Navigation Chart (ENC) US3OR01M using CUBE surfaces and contours created in Caris. The ENC used for comparison is the most recently updated version.

D.1.1 Electronic Navigational Charts

The following are the largest scale ENC's, which cover the survey area:

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US3OR01M	1:185238	35	11/07/2017	10/19/2018	NO

Table 14: Largest Scale ENC's

US3OR01M

A comparison with H13137 surveyed contours and ENC US3OR01M revealed the following: All surveyed contours generally agree with the ENC charted depth curves. Minor revision is required for the H13137 survey area.

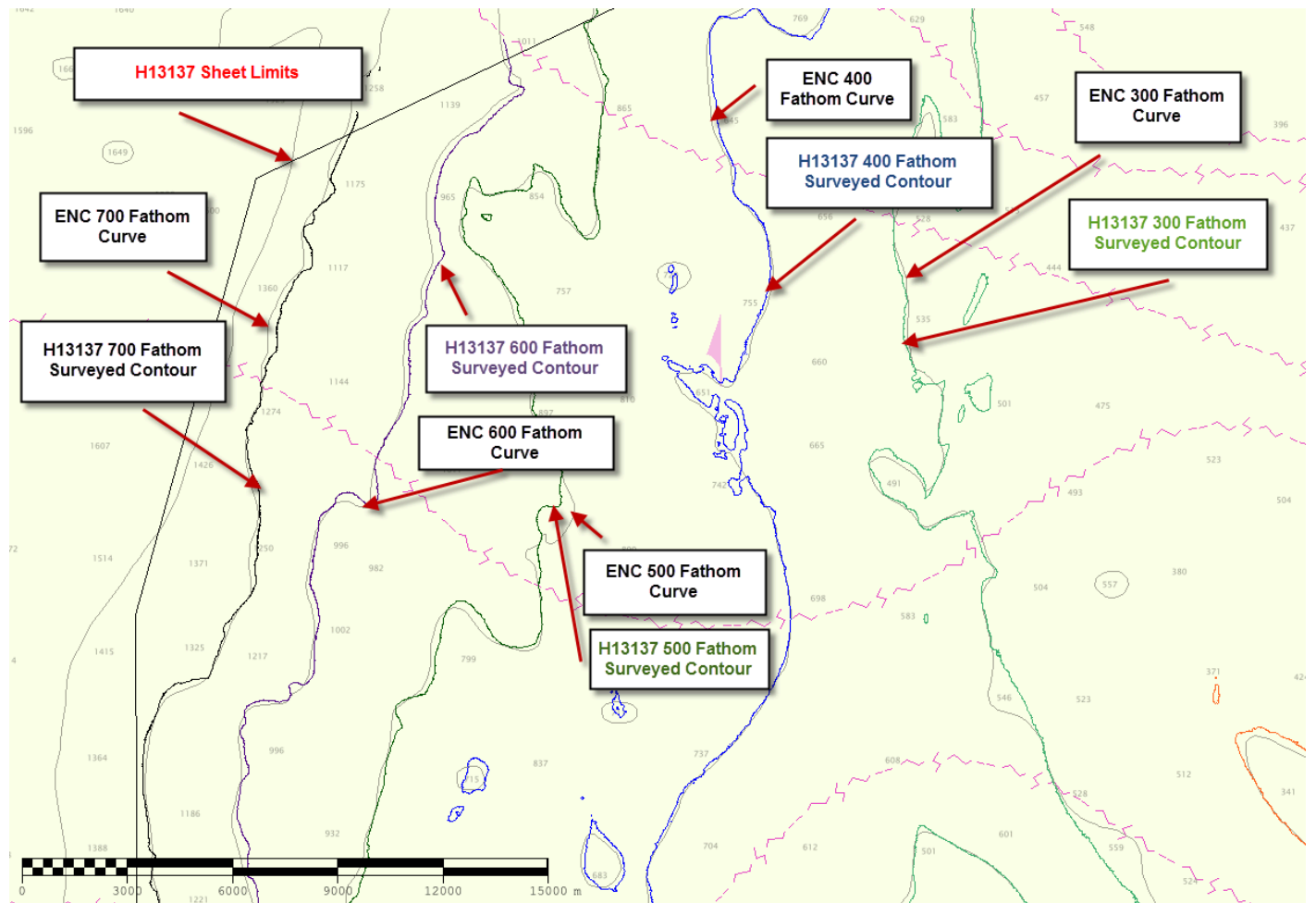


Figure 15: ENC US3OR01M overlaid with H13137 derived contours.

D.1.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.3 Charted Features

No charted features exist for this survey.

D.1.4 Uncharted Features

No uncharted features exist for this survey.

D.1.5 Shoal and Hazardous Features

No shoals or potentially hazardous features exist for this survey.

D.1.6 Channels

No channels exist for this survey. There are no designated anchorages, precautionary areas, safety fairways, traffic separation schemes, pilot boarding areas, or channel and range lines within the survey limits.

D.1.7 Bottom Samples

No bottom samples were required for this survey.

D.2 Additional Results

D.2.1 Shoreline

Shoreline was not assigned in the Hydrographic Survey Project Instructions or Statement of Work.

D.2.2 Aids to Navigation

No Aids to navigation (ATONs) exist for this survey.

D.2.3 Overhead Features

No overhead features exist for this survey.

D.2.4 Submarine Features

Several submarine cables and a non-dangerous wreck are charted in the H13137 survey area, but no evidence of these features was found in the MBES data. Multiple submarine cables exist in the northern portion of the H13137 survey area from west to east, depicted in the ENC and Raster Nautical Chart (RNC). The Final Feature File (FFF) was updated to reflect this with retention of the cables and the removal of the wreck recommended.

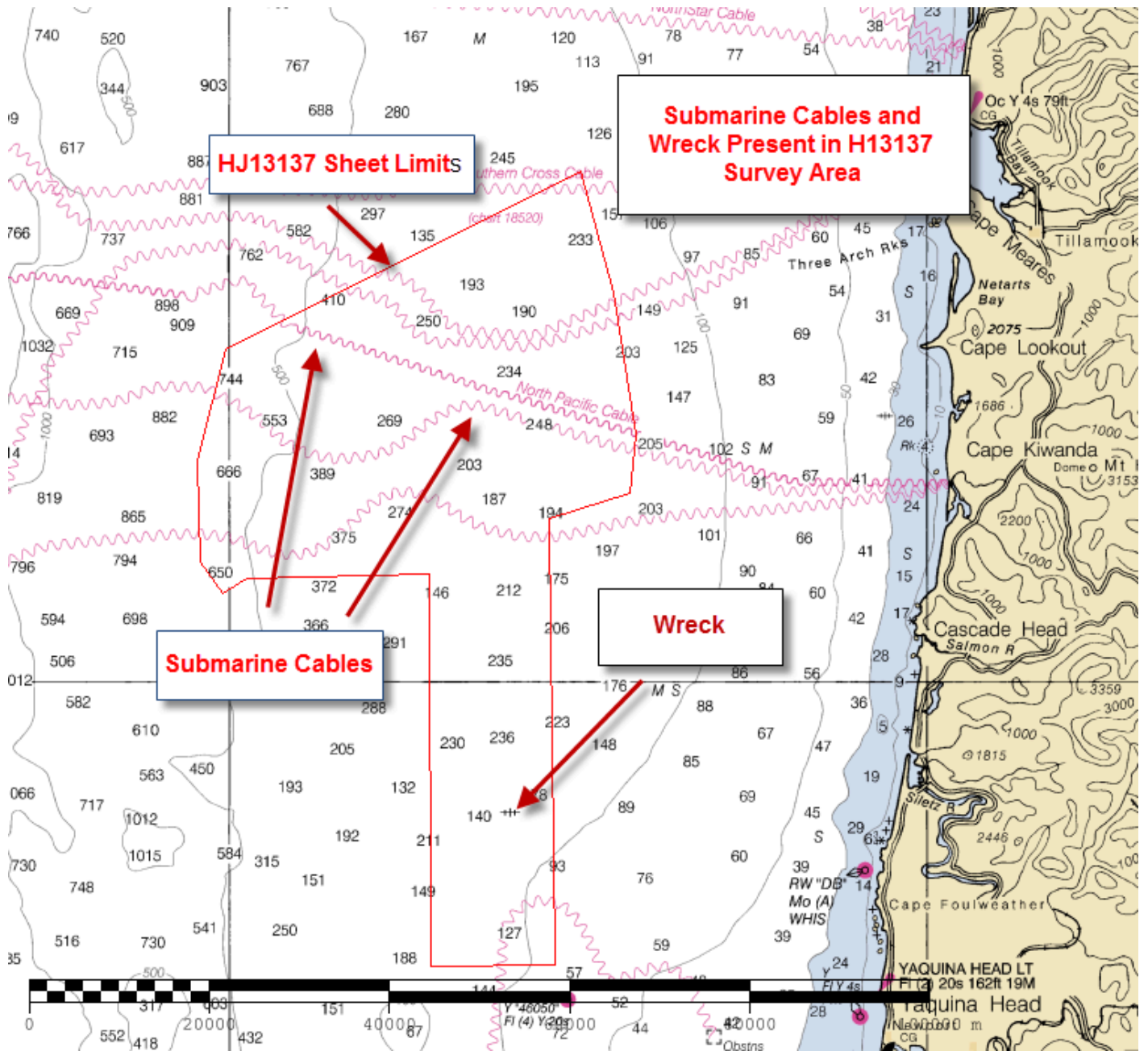


Figure 16: Submarine cables and wreck present in the H13137 survey area.

D.2.5 Platforms

No platforms exist for this survey.

D.2.6 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.7 Abnormal Seafloor and/or Environmental Conditions

No abnormal seafloor and/or environmental conditions exist for this survey.

D.2.8 Construction and Dredging

No present or planned construction or dredging exist within the survey limits.

D.2.9 New Survey Recommendation

No new surveys or further investigations are recommended for this area.

D.2.10 Inset Recommendation




No new insets are recommended for this area.

E. Approval Sheet

As Chief of Party, field operations for this hydrographic survey were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports.

All field sheets, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to the Processing Branch.

The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables, Field Procedures Manual, Letter Instructions, and all HSD Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Descriptive Report.

Approver Name	Approver Title	Approval Date	Signature
Benjamin K. Evans, CDR/NOAA	Chief of Party	02/05/2019	 Digitally signed by EVANS.BENJAMIN.K.1237217094 Date: 2019.02.07 09:58:11 -08'00'
Andrew R. Clos, LT/NOAA	Field Operations Officer	02/05/2019	
James B. Jacobson	Chief Survey Technician	02/05/2019	 JACOBSON.JAMES.BRYAN.1269664017 I have reviewed this document 2019.02.06 08:50:13 -08'00'
Carl R. Stedman	Sheet Manager	02/05/2019	STEDMAN.CARL.ROBERT .1166866517 Digitally signed by STEDMAN.CARL.ROBERT.1166866517 Date: 2019.02.06 12:22:49 -08'00'

F. Table of Acronyms

Acronym	Definition
AHB	Atlantic Hydrographic Branch
AST	Assistant Survey Technician
ATON	Aid to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BAG	Bathymetric Attributed Grid
BASE	Bathymetry Associated with Statistical Error
CO	Commanding Officer
CO-OPS	Center for Operational Products and Services
CORS	Continuously Operating Reference Station
CTD	Conductivity Temperature Depth
CEF	Chart Evaluation File
CSF	Composite Source File
CST	Chief Survey Technician
CUBE	Combined Uncertainty and Bathymetry Estimator
DAPR	Data Acquisition and Processing Report
DGPS	Differential Global Positioning System
DP	Detached Position
DR	Descriptive Report
DTON	Danger to Navigation
ENC	Electronic Navigational Chart
ERS	Ellipsoidal Referenced Survey
ERTDM	Ellipsoidally Referenced Tidal Datum Model
ERZT	Ellipsoidally Referenced Zoned Tides
FFF	Final Feature File
FOO	Field Operations Officer
FPM	Field Procedures Manual
GAMS	GPS Azimuth Measurement Subsystem
GC	Geographic Cell
GPS	Global Positioning System
HIPS	Hydrographic Information Processing System
HSD	Hydrographic Surveys Division

Acronym	Definition
HSSD	Hydrographic Survey Specifications and Deliverables
HSTB	Hydrographic Systems Technology Branch
HSX	Hypack Hysweep File Format
HTD	Hydrographic Surveys Technical Directive
HVCR	Horizontal and Vertical Control Report
HVF	HIPS Vessel File
IHO	International Hydrographic Organization
IMU	Inertial Motion Unit
ITRF	International Terrestrial Reference Frame
LNM	Linear Nautical Miles
MBAB	Multibeam Echosounder Acoustic Backscatter
MCD	Marine Chart Division
MHW	Mean High Water
MLLW	Mean Lower Low Water
NAD 83	North American Datum of 1983
NALL	Navigable Area Limit Line
NTM	Notice to Mariners
NMEA	National Marine Electronics Association
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NRT	Navigation Response Team
NSD	Navigation Services Division
OCS	Office of Coast Survey
OMAO	Office of Marine and Aviation Operations (NOAA)
OPS	Operations Branch
MBES	Multibeam Echosounder
NWLON	National Water Level Observation Network
PDBS	Phase Differencing Bathymetric Sonar
PHB	Pacific Hydrographic Branch
POS/MV	Position and Orientation System for Marine Vessels
PPK	Post Processed Kinematic
PPP	Precise Point Positioning
PPS	Pulse per second

Acronym	Definition
PRF	Project Reference File
PS	Physical Scientist
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
RTX	Real Time Extended
SBES	Singlebeam Echosounder
SBET	Smooth Best Estimate and Trajectory
SNM	Square Nautical Miles
SSS	Side Scan Sonar
SSSAB	Side Scan Sonar Acoustic Backscatter
ST	Survey Technician
SVP	Sound Velocity Profiler
TCARI	Tidal Constituent And Residual Interpolation
TPU	Total Propagated Uncertainty
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDF	Zone Definition File



**UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration**

NOAA Ship Rainier
2002 SE Marine Science Drive
Newport, OR 97365-5229

November 16th, 2018

Digitally signed by
TURNER.PAUL.TO
WERS.1365899394
Date: 2018.11.18
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MEMORANDUM FOR: Paul Turner, NOAA
Cascadia Margin and CalDIG Project Manager, HSD

FROM: Commander Benjamin Evans, NOAA
Commanding Officer, NOAA Ship *Rainier*

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EVANS.BENJAMIN.K.12372170
94
Date: 2018.11.16 16:38:51
-08'00'

SUBJECT: Waiver Request: Crossline and Holiday Acquisition
Projects: OPR-L373-RA-18 and OPR-M367-RA-18

Due to the priorities of USGS and BOEM to maximize the amount of area covered by MBES data, *Rainier* is requesting a waiver to modify our crossline and holiday acquisition requirements. *Rainier* requests that the requirement to acquire crossline data and fill in gaps in MBES coverage be waived for surveys with projects OPR-L373-RA-18 and OPR-M367-RA-18.

The following sheets are affected:

H13117, H13118, H13119, H13137, H13206, D00248, H13151 and H13152.

Justification

These surveys are primarily for seafloor mapping and sub-bottom profiling as opposed to nautical charting. The surveys areas are miles offshore of the Oregon and California coasts and in sufficiently deep water that the potential for hazards to navigation is extremely small.

The partnering organizations (USGS and BOEM) do not have use for crossline or holiday coverage, and specifically requested that we dispense with this requirement. As a result, the crossline requirement was not met on all surveys of these projects. While every effort was made to avoid holidays, some small gaps between lines do exist and were not filled.

Decision

Waiver is:

TURNER.PAUL.TO Digitally signed by
WERS.1365899394 TURNER.PAUL.TOWERS.13658
99394
4 Date: 2018.11.18 08:18:21
-05'00'

Granted

Denied

cc: Chief, HSD OPS; OPS-RA, CHST-RA



APPROVAL PAGE

H13137

Data meet or exceed current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data except where noted are adequate to supersede prior surveys and nautical charts in the common area.

The following products will be sent to NCEI for archive

- Descriptive Report
- Collection of Bathymetric Attributed Grids (BAGs)
- Collection of backscatter mosaics
- Processed survey data and records
- GeoPDF of survey products

The survey evaluation and verification has been conducted according current OCS Specifications, and the survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.

Approved: _____

Commander Olivia Hauser, NOAA
Chief, Pacific Hydrographic Branch